



THE HANFORD SITE

Department Update

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Manager

Office of River Protection
Richland Operations Office

15 December 2021

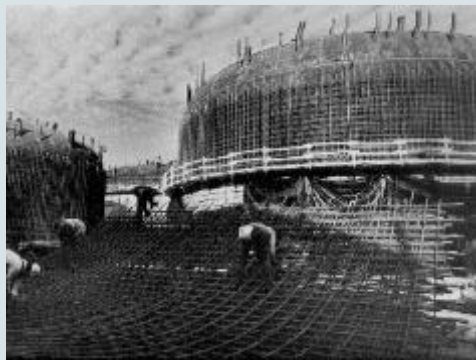
National Defense: Hanford Plutonium Production

World War II and Post-War Era (1944 – 1955)



**Approx. 6 tons
of plutonium**

Cold War Era (1947 – 1991)



**Approx. 68 tons
of plutonium**

Hanford Reactors:

B Reactor 1944 – 1968
D Reactor 1944 – 1967
F Reactor 1945 – 1965
H Reactor 1949 – 1965
DR Reactor 1950 – 1964
C Reactor 1952 – 1969
KW Reactor 1955 – 1970
KE Reactor 1955 – 1971
N Reactor 1963 – 1987

**Total: Approx. 74 tons
of plutonium**

Cleanup Progress Since 1989

NINE reactors | **SIX** cocooned | **ONE** preserved

674 tons of contamination removed from groundwater

27 billion gallons of groundwater treated

100% of the site's spent fuel has been moved to dry storage

**HANFORD
CLEANUP
by the NUMBERS** #s

18.7 million tons of soil/debris moved to engineered landfill

932 facilities demolished

1,354 waste sites remediated

12,687 cubic meters of plutonium-contaminated waste retrieved

As of September 2021

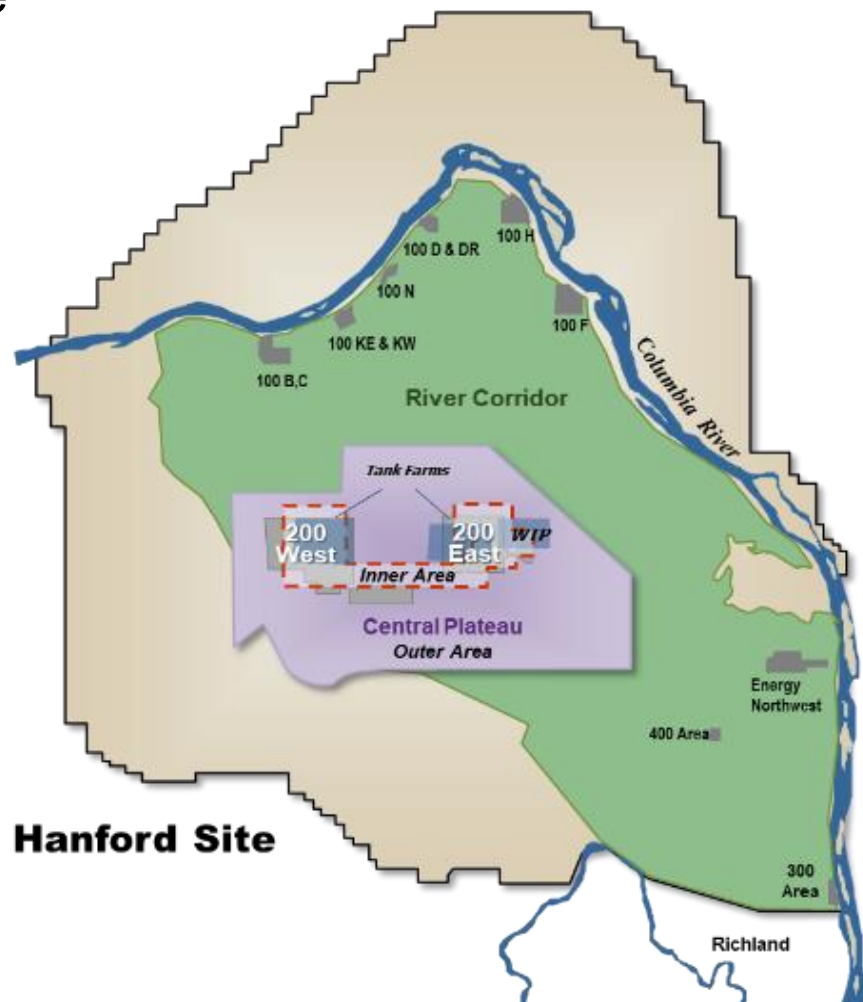
Mission: Safe, efficient, and effective cleanup; protective of the workforce, the public and the environment

Two DOE Offices:

- Richland Operations Office
- Office of River Protection

Key Site Activities:

- Safe and secure operations
- Manage, treat and disposition tank waste
- Stabilize aging structures
- Demolish retired facilities
- Remediate waste sites
- Treat contaminated groundwater





November 2021

Masks required



November 2021

Vaccines available

Direct-Feed Low-Activity Waste Update



Startup testing of equipment and systems



Effluent Management Facility



New reverse osmosis system / Effluent Treatment Facility



Integrated Disposal Facility



November 2021

Completion of readiness assessments



November 2021

Process Enclosure



November 2021

Ion exchange columns

Readiness Verification Activities (Facility Focus)

Phase Gates: Readiness for Sustained Operations (Operations Culture)

WTP

Hot Commissioning

Cold Commissioning

Pre-Cold Commissioning

Legend:

Credited for DOE O 425.1 ORR

Additional readiness activities (not credited)

● Complete

● Not yet complete

Operational Readiness Reviews

Operational Readiness Checklist – Melter 2 Heat-up

Documented Safety Analysis Independent Verification Review

Cold Commissioning Management Assessment

Emergency Preparedness Exercise

Operational Readiness Checklist – Melter 1 Heat-up

Pre-Startup Safety Review

Phase Gate 4

Phase Gate 3

Phase Gate 2

Phase Gate 1

Phase Gate 4: DFLAW Hot Operations

- Readiness to support tank waste feed operations 24/7
- TSCR, IDF, ETF, LAB, and BOF ready to support LAW operations with radioactive tank waste feed
- DFLAW portfolio of facilities, projects, and site services operating as an integrated system to support sustained 24/7 operations

Phase Gate 3: Melter 2 Heat-Up

- Melter 1 successfully operating
- Resources in place across DFLAW enterprise to support increased operational tempo
- Support facilities have operational margin for second melter operations
- Lessons learned from Melter 1 heat-up incorporated
- DFLAW support facilities on schedule

Phase Gate 2: Melter 1 Heat-Up

- LAW Facility safety basis approved
- LAW Facility readiness verification (people, paper, processes)
- BOF and external support facilities ready for continuous melter operations
- DFLAW support facilities on schedule

Phase Gate 1: DFLAW Operations Integration

DOE O 425.1, 2019, *Verification of Readiness to Start Up or Restart Nuclear Facilities*, Chg. 2, U.S. Department of Energy, Washington, D.C., October 4.

BOF = Balance of Facilities
DFLAW = direct-feed low-activity waste
ETF = Effluent Treatment Facility

IDF = Integrated Disposal Facility
LAB = Analytical Laboratory
LAW = low-activity waste

ORR = operational readiness review
TSCR = Tank-Side Cesium Removal
WTP = Waste Treatment and Immobilization Plant

Over 25 unique operations taking place simultaneously on a daily basis to support DFLAW mission

Facilities and Operations:

- Emergency and Medical Service Support:** 24/7 operations
- Information Technology:** Provides 4 different networks, 1,100 radios per day, 3 external servers
- Electrical Utilities:** DFLAW uses >50MW of power per day. Equal use to 40,000 homes per day.
- Occupational Medical Facility:** 6 a.m. to midnight, M-F; 7 a.m. to 4 p.m. on Saturday
- Water and Sewer Utilities:** Produces 3.5 million gallons of water a day to DFLAW. * City of Richland requires 2.8 million gallons of water per day.
- 222-S Laboratory:** Process 4 verifications per year
- Low-Activity Waste Facility:** Process 9 samples per day. Waste sample. Glass forming recipe. Waste travels 3,615 feet from Tank AP-106 to EMF. Producing a nominal 3.5 containers per day. 21 tons of material per day. 5,500 plant procedures. Heated to 2,100°F. 2 melters. 7 sources tail. Travel 1.5 miles, nominally 5 containers per day. Containers are 4 feet in diameter, 7 feet tall, over 7 tons.
- Tank AP-106:** 1 transfer per day, 8,000 gallons to produce. Shut down every 23 days for column exchange. Process 5 gallons a minute. Treated Waste. Transfer 7,200 gallons a day.
- Tank AP-107:** 2 samples per year
- Tank AP-105:** 28 double-shell tanks. 53 million gallons of waste. AP-105 to AP-107 transfer.
- Immobilized Low-Activity Waste Transporters:** 7 containers per day
- Effluent Management Facility (EMF):** 24/7 operations. 45,000 - 95,000 gallons of effluent 1-2 times a week.
- Liquid Effluent Retention Facility:** 45 operational days per campaign
- Effluent Treatment Facility:** 7 days a week for 10 hours a day operations. 742 feet x 1,648 feet
- Integrated Disposal Facility:** 742 feet x 1,648 feet
- 222-S Laboratory:** 8-10 shipments daily of oil, bulk chemicals, parts and general supplies.
- Roadways:** 2 samples per year

Key Operations to Glass Storage:

- Where it all STARTS
- Double-shell Tank to Double-shell Tank Transfer
- Double-shell Tank to Tank AP-107 Transfer
- Tank AP-107 to Tank-Side Cesium Removal
- Tank-Side Cesium Removal to Tank AP-106
- EMF to Low-Activity Waste
- Secondary waste stream
- Glass container to Integrated Disposal Facility

 Tank Farms
 222-S Laboratory
 Waste Treatment and Immobilization Plant
 Effluent Treatment Facility
 Disposal Operations
 Infrastructure Services
 Occupational Medicine





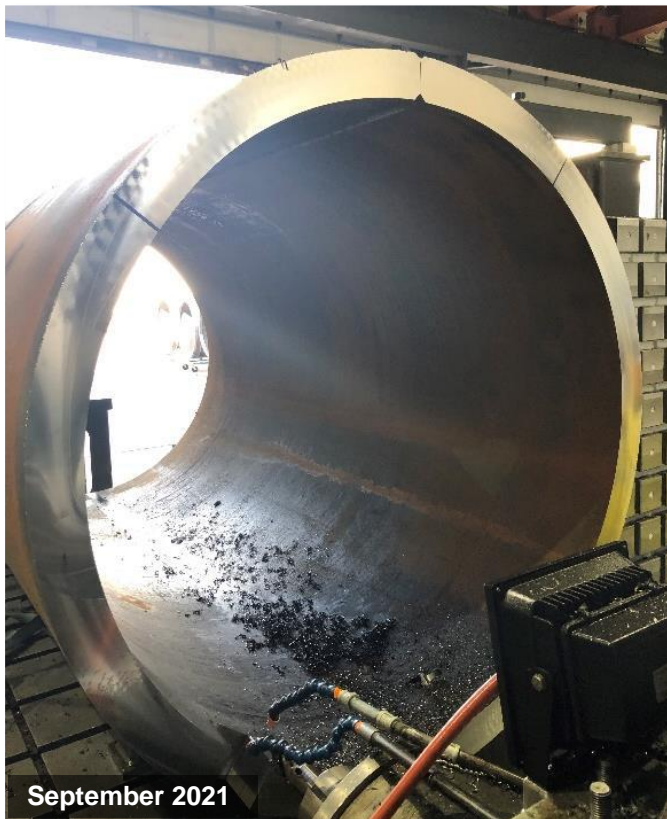
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Plutonium Finishing Plant



July 2021

242-A Evaporator



WESF Project cask storage system fabrication



K West Basin



K East Reactor



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200 West Pump and Treat Facility



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324 Building



Central Plateau Water Treatment Facility

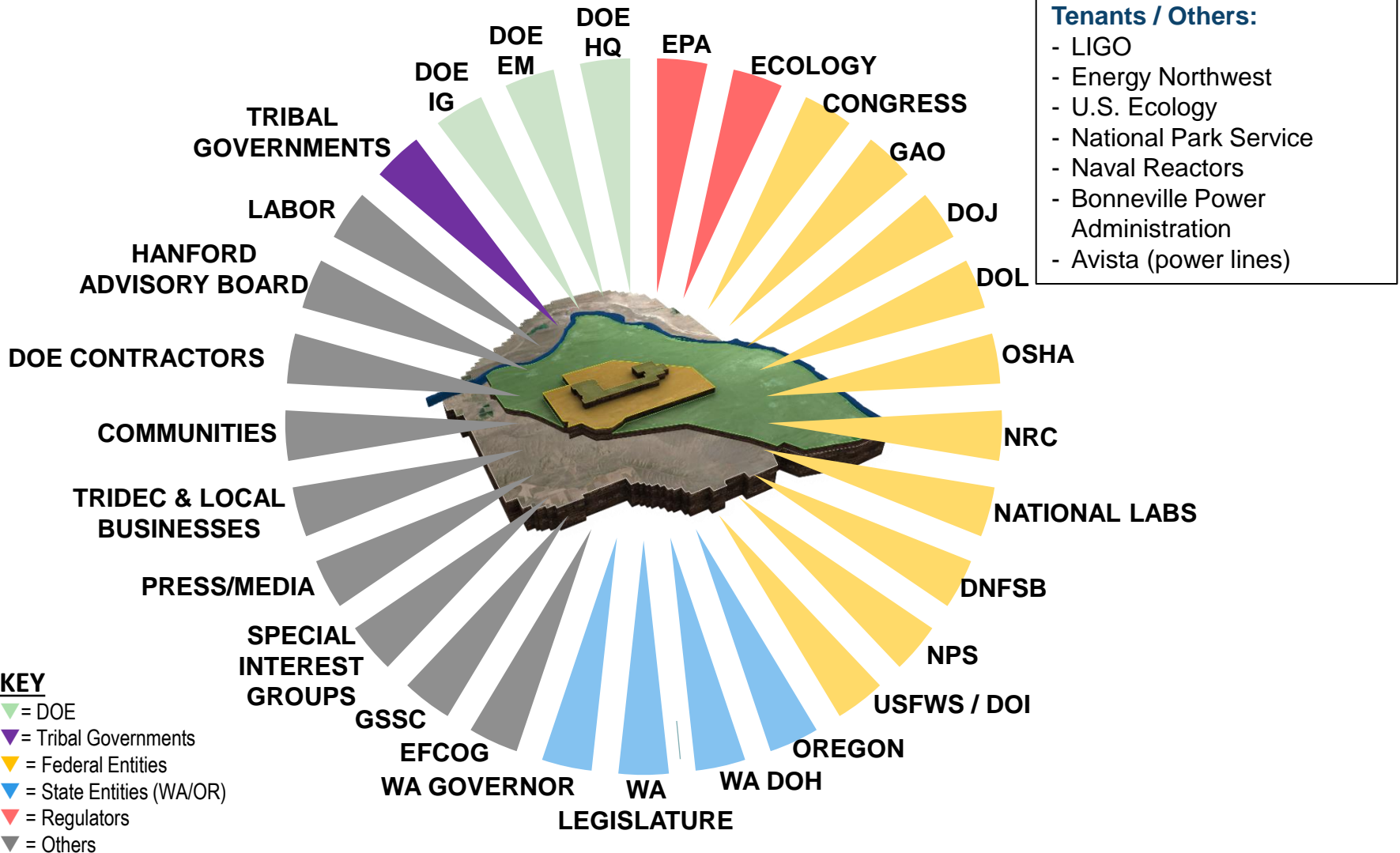


Multicraft Maintenance Facility in the 200 East Area

Integrated Tank Disposition Contract Overview

- Integrates the Tank Operations Contract and Waste Treatment and Immobilization Plant operations
- Single-award Indefinite Delivery / Indefinite Quantity contract type based on the End-State Contracting model
- \$45 billion contract ceiling with a 10-year ordering period
- Request for proposals issued on 21 October 2021
- Proposals due 6 January 2022

Engaged Parties



- Quarterly Tribal affairs meetings
- Tribal Nations summit
- 23 Speakers Bureau briefings
- Oregon Hanford Cleanup Board meetings
- Regular outreach to local mayors, state and federal legislators
- Public comment periods





Hanford Site

September 2021

